

CLAIMS

1. Method for producing embossing rollers, comprising a first step of forming a series of protrusions and a second step of forming a pattern or design which comprises the at least partial removal of a certain number of said protrusions so that the remaining protrusions surround the pattern or design.

2. Method according to claim 1, wherein said first step of forming said series of protrusions comprises a machining operation.

10 3. Method according to claim 1, wherein said first step of forming said series of protrusions comprises a chemical process.

4. Method according to claim 1, wherein said first step of forming said series of protrusions is followed by a finishing operation.

15 5. Method according to claim 1, wherein said second step of forming a pattern or design, which comprises the at least partial removal of a certain number of said protrusions, is performed by a numeric-control machine.

20 6. Method according to claim 1, wherein said second step of forming a pattern or design which comprises the at least partial removal of a certain number of said protrusions is performed by a knurling machine.

25 7. Method according to claim 5, wherein said numeric-control machine is a milling machine.

8. A method as set forth in claim 1 wherein each of said protrusions is non-continuous in the cross machine direction.

5 9. A method as set forth in claim 8 wherein the roller has a width in the cross machine direction and has a circumference, wherein each of said protrusions has a protrusion width in the cross machine direction, the protrusion width being substantially less than the width of the roller, and wherein each of said protrusions has a protrusion dimension in the direction of the circumference
10 of the roller, the protrusion dimension being substantially less than the circumference of the roller.

10. A method as set forth in claim 9 wherein each of the protrusions is a truncated pyramid.

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11. A method for producing an embossing roller, the roller having a width in the cross machine direction and having a circumference, said method comprising the steps of:

- 5 forming on the roller a series of protrusions, each of said protrusions having a protrusion width in the cross machine direction, the protrusion width being substantially less than the width of the roller, and each of said protrusions having a protrusion dimension in the direction of the circumference of the roller, the protrusion dimension being substantially less than the circumference of the roller; and
- 10 forming on the roller a pattern or design by at least partially removing a certain number of said protrusions.

12. A method according to claim 11, wherein said step of forming said series of protrusions comprises a machining operation.

15 13. A method according to claim 11, wherein said step of forming said series of protrusions comprises a chemical process.

20 14. A method according to claim 11, wherein said step of forming said series of protrusions is followed by a finishing operation.

25 15. A method according to claim 11, wherein said step of forming a pattern or design by at least partially removing a certain number of said protrusions is performed by a numeric-control machine.

16. A method according to claim 11, wherein said second step of forming a pattern or design by at least partially removing a certain number of said protrusions is performed by a knurling machine.

5 17. A method according to claim 15, wherein said numeric-control machine is a milling machine.

18. A method as set forth in claim 11 wherein each of the protrusions is a truncated pyramid.

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19. A method of manufacturing a diaper, the method comprising the steps of:

(a) providing a sheet of diaper backsheet material;

5 (b) embossing the backsheet material by compressing the backsheet material between a hard roller and a resilient roller; and

(c) combining the embossed backsheet material with other materials to provide a finished diaper.

10 20. The method of claim 19, wherein step (b) improves the aesthetics of the material.

21. The method of claim 19, wherein step (b) includes making the sheet of material more cloth-like.

15 22. The method of claim 19, wherein the sheet of material includes relatively low-caliber raw materials having relatively low quality and low cost.

20 23. The method of claim 19, wherein step (b) includes embossing one of a brand name and graphics on the material.

24. The method of claim 19, wherein step (b) includes improving the hand feel of the material by making the material softer.

25. The method of claim 19, wherein the hard roller is made of steel.

26. The method of claim 25, further comprising the step of forming a recess in the resilient roller prior to compressing the sheet between the rollers.

27. A method for embossing a sheet of material comprising, the method comprising the steps of:

- 5 (a) providing a first embossing roller by forming on the outer surface of a generally cylindrical roller a series of protrusions, and forming on the roller a pattern or design by at least partially removing a certain number of said protrusions so that the remaining protrusions surround the pattern or design;
- (b) providing a second roller; and
- (c) compressing the sheet of material between the first and second rollers.

10 28. The method of claim 27, wherein the sheet of material is a web of diaper backsheet material.

29. The method of claim 27, wherein step (c) improves the aesthetics of the material.

15 30. The method of claim 27, wherein step (c) includes making the sheet of material more cloth-like.

31. The method of claim 27, wherein the sheet of material includes
20 relatively low-caliber raw materials having relatively low quality and low cost.

32. The method of claim 27, wherein step (c) includes embossing one of a brand name and graphics on the material.

33. The method of claim 27, wherein step (c) includes improving the hand feel of the material by making the material softer.

34. The method of claim 27, wherein the first roller is made of steel
5 and the second roller is resilient.

35. The method of claim 34, further comprising the step of forming a recess in the resilient second roller prior to step (c).

10 36. The method of claim 34, further comprising the steps of (d) providing a third roller that is made of steel, and (e) providing a second sheet of material, and wherein step (c) includes compressing the second sheet of material between the resilient second roller and the steel third roller.

37. A method for embossing a sheet of material comprising, the method comprising the steps of:

(a) providing a first embossing roller having a width in the cross machine direction and having a circumference, by forming on the outer surface of a generally cylindrical roller a series of protrusions, each of said protrusions having a protrusion width in the cross machine direction, the protrusion width being substantially less than the width of the roller, and each of said protrusions having a protrusion dimension in the direction of the circumference of the roller, the protrusion dimension being substantially less than the circumference of the roller, and by forming on the roller a pattern or design by at least partially removing a certain number of said protrusions;

(b) providing a second roller; and

(c) compressing the sheet of material between the first and second rollers.

38. The method of claim 37, wherein the sheet of material is a web of diaper backsheet material.

39. The method of claim 37, wherein step (c) improves the aesthetics of the material.

40. The method of claim 37, wherein step (c) includes making the sheet of material more cloth-like.

41. The method of claim 37, wherein the sheet of material includes relatively low-caliber raw materials having relatively low quality and low cost.

42. The method of claim 37, wherein step (c) includes embossing one of a brand name and graphics on the material.

5 43. The method of claim 37, wherein step (c) includes improving the hand feel of the material by making the material softer.

44. The method of claim 37, wherein the first roller is made of steel and the second roller is resilient.

10 45. The method of claim 44, further comprising the step of forming a recess in the resilient second roller prior to step (c).

15 46. The method of claim 44, further comprising the steps of (d) providing a third roller that is made of steel, and (e) providing a second sheet of material, and wherein step (c) includes compressing the second sheet of material between the resilient second roller and the steel third roller.